SOME NORTHEASTERN SPECIES OF SCIRPUS.

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In a recent preliminary discussion[1] of the "wool-grasses" it was shown that in the northeastern states there were two very distinct specific types which had long been confused as *Scirpus Eriophorum*. Since that time a large amount of material has been furnished by Dr. K. M. Wiegand, of Cornell University, showing a third species which is abundant in western New York, and during the past year field observations of the plants were carried on by the writer in southwestern New Hampshire, and a very exhaustive study of the group in Vermont has been made by President Ezra Brainerd. Specimens and critical notes have also been prepared by Mr. O. A. Farwell in Michigan, by Mr. C. H. Bissell in Connecticut, and by several others who have kindly placed at the disposal of the writer the results of their studies. In this more extended examination of the "wool-grasses" special aid has been rendered by the discriminating observations and criticisms of President Brainerd of Middlebury College.

From these more detailed studies it seems probable that, in the desire to avoid too radical a treatment of the plants, the northern *Scirpus cyperinus*, Kunth, was erroneously called a variety of the southern *S. Eriophorum*, Michx. The latter species, when mature, is of a pale terra-cotta brown, having a decidedly reddish tinge; and the sheaths of its involucre and involucels are for the most part of a deeper shade of the same color. The rays of the umbel are mostly ascending, but the numerous raylets are slender and drooping. The spikelets are usually in 3's, the middle one sessile, the two outer on more or less elongated pedicels. This plant, characterized by its terra-cotta color and slender-pedicelled spikes, is abundant on the southern coast of the United States extending north into New Jersey. Southward it matures in late July and August, but in Virginia its "wool" becomes conspicuous in September.

The common northern plant, *Scirpus cyperinus*, which in the former treatment was called a variety of *S. Eriophorum*, seems now, from a study of material from many localities, to be so clearly distinct from the southern plant as to warrant its recognition as a species. When

[1] Contrib. Gray Herb. n.s. XV. (Proc. Am. Acad. xxxiv. 498). See also synopsis in Rhodora, i. 137.

mature the wooly inflorescence is of a dull brown color with little or no suggestion of terra-cotta or reddish. The sheaths of the involucels are generally a sepia or dark brown, and of the involucre a slightly paler tint. The raylets of the umbel are much less drooping than in *S. Eriophorum*, often very stiff and ascending, and the spikelets are all sessile in glomerules. In New England this species matures its fruit in late August and early September. The two extreme forms described as varieties *condensatus* and *Andrewsii* of *S. Eriophorum*, have their affinities much more with the northern *S. cyperinus*.

The other species, first definitely called to the attention of the author by Dr. Wiegand, proves to be abundant in the Connecticut Valley, and from there westward to Michigan and Wisconsin. It is essentially as stout as *S. cyperinus*, but in color the mature inflorescence is a pale yellowish brown, and the rays and raylets of the extremely dichotomous umbel are more slender and flexuous. The ultimate involucels with brown, not terra-cotta sheaths, bear small umbels of from 2 to 5 spikelets, the central spikelets sessile, the others on slender pedicels. Thus in habit this northern plant with yellowish-brown inflorescence somewhat resembles the stouter southern terra-cotta colored *S. Eriophorum*. In addition to its difference of color and stoutness, the northern plant has shorter bristles, 5. mm. long, those of the southern plant averaging 7. mm. long.

In Virginia *Scirpus Eriophorum* is mature in September, but its northern representative with the pale yellowish-brown wool is fully mature in New England and New York in late July and early August.

The following forms of this group are now recognized in New England.

SCIRPUS CYPERINUS, Kunth, Enum. ii. 170. *S. Eriophorum*, Michx., var. *cyperinus*, Gray, Man. ed. 2, 501 ; Fernald, Proc. Am. Acad. xxxiv. 501. — Common throughout, mature in late August and early September.

S. CYPERINUS, var. **condensatus.** *S. Eriophorum*, var. *condensatus*, Fernald, l.c. — Same range as species but less common.

S. CYPERINUS, var. **Andrewsii.** *S. Eriophorum*, var. *Andrewsii*, Fernald, l.c. — Originally from Southington, Connecticut: recently collected at East Middlebury, Vermont, Sept. 11, 1899 (*Ezra Brainerd*).

S. pedicellatus. Tall (1.8 m. or less in height) and stout (culm, just below the involucre, 2 to 4 mm. in diameter) : leaves 0.5 to 1 cm. wide : inflorescence resembling that of *S. Eriophorum*, with more slender unequal rays, but with none of the primary umbellules

elevated far above the others; the involucre and involucels brown not terra-cotta at base: spikelets ovoid-oblong, 4 to 6 mm. long, from 2 to 5 in clusters at the tips of the filiform flexuous branchlets, the middle spikelet sessile, the others slender-pedicelled: scales brown or yellowish-brown; bristles pale brown, 5 mm. long. — A characteristic plant, the northern representative of *S. Eriophorum*. Alluvial marshes and thickets, from the Connecticut Valley to Michigan and Wisconsin. Specimens examined: — NEW HAMPSHIRE, Walpole, Aug. 2 (over-ripe), 1899 (*M. L. Fernald*, Herb. Alstead School Nat. Hist. no. 1): VERMONT, North Hero, July 30, Aug. 6 (over-ripe), 1899; Knight's Island, Aug. 6 (over-ripe), 1899; Lake Dunmore, Aug. 15 (over-ripe), 1899; Woodbury, alt. 460 m., Aug. 22, 1899 (*Ezra Brainerd*): NEW YORK, Ithaca, July 11, 1893, July 15 (over-ripe), 1894, July 25 (over-ripe), 1895 (*K. M. Wiegand*): MICHIGAN, Troy, (*Houghton*): WISCONSIN, Alma, 1861 (*T. J. Hale*).

S. PEDICELLATUS, var. **pullus.** Rays somewhat more unequal than in the species: spikelets duller brown and longer, 7 to 10 mm. long. — VERMONT, along Otter Creek, Middlebury, Aug. 11 (over-ripe), 1899 (*Ezra Brainerd*): MASSACHUSETTS, Williamstown, Aug. 9, 1898 (*J. R. Churchill*).

S. ATROCINCTUS, Fernald, l. c. 502. — Throughout New England, northward and westward, mature in late June and July, or in the mountains in early August. A very pale form, rather more lax than the type and with weaker coloring in the sheaths, has been collected in New Hampshire, Vermont and Michigan.

S. ATROCINCTUS, var. BRACHYPODUS, Fernald, l.c. 503. — Range of the species, but more common northward and at higher altitudes.

S. ATROCINCTUS, var. **grandis.** Taller (1 to 1.8 m. high) and stouter throughout than the species; culm just below the involucre often 2 or 2.5 mm. in diameter: leaves 4 to 7 mm. wide: inflorescence generally longer than in the species, 2 or 3 dm. long, rays very unequal, some of the primary ones far overtopping the others: spikelets oblong, 7 to 10 mm. long, grayish brown. — NEW HAMPSHIRE, Alstead, Aug. 9, 1899 (*M. L. Fernald*, Herb. Alstead School Nat. Hist. no. 2): VERMONT, Middlebury, Creek Road, Aug. 11, 1899, Battell's Pond, Aug. 17, 1899 (*Ezra Brainerd*). An anomalous plant, from its coarse habit, somewhat brownish color, and rather late-flowering season suggesting a possible relationship with *S. pedicellatus;* but with the black involucre, grayish tinge in the spikelets, and elongation of some of the primary rays so characteristic of *S. atrocinctus*.

While collecting and studying this group of species some other *Scirpi* have been found which are undescribed or ordinarily misinterpreted. One of these, which so far as yet known is confined to the Connecticut Valley, was discovered in 1881 in Vermont, by the late Edwin Faxon and it has since been collected in that state by President

Brainerd, and in New Hampshire by the writer. It is a very handsome and unique plant, not closely related to any described species. In its achene it is near the *Scirpus Eriophorum* group, but the bristles are much shorter and less crinkled, and inconspicuous in the fruiting plant, in this character approaching *S. lineatus*. In its ascending stiffish rays and raylets, however, it is unlike any of those species. From the very dark color of its spikelets this plant may be called

S. atratus. Culms tall, 1 to 1.75 m. high, rather slender (just below the involucre averaging 2.15 mm. in diameter) : leaves averaging 7 (5 to 9) mm. wide : involucre black or black and chestnut-brown at base : inflorescence 1 to 2 dm. high, occasionally producing branches from lower sheaths ; umbel of many dichotomous rays of various lengths, 2 to 4 of them more elongated and ascending, the others shorter, somewhat divergent ; the raylets slender but stiff, scarcely drooping : spikelets oblong-lanceolate, about 8 mm. long, sessile or subsessile in clusters of from 2 to 6 : scales oblong-ovate, acute or obtusish, below pale or reddish-tinged, above blackish with a slight ferrugineous tinge : achene 1 mm. long, pale, 3-angled, obovate-oblong : bristles about 2.5 mm. long, curling when dry. — In a wet thicket, Alstead, NEW HAMPSHIRE, July 30, 1899 (*M. L. Fernald*, Herb. Alstead School Nat. Hist. no. 3). Formerly collected at Sutton, VERMONT, Aug. 11, 1881 (*Edwin Faxon*), and at Ripton, VERMONT, July 17, 1898 (*Ezra Brainerd*).

A common "bulrush" of northern New England and the region about the Great Lakes has been known in our floras as *Scirpus sylvaticus* var. *digynus*, Böckeler, or *S. microcarpus*, Presl. The history of the treatment of this common northeastern plant and its immediate congeners is interesting.

In 1828, Presl described his *Scirpus microcarpus*,[1] a plant with the "habit of *S. sylvaticus*," and with bifid style, the type specimens coming from Nootka Sound (west coast of Vancouver Island), and from Mulgrave (on Bering Straits). In 1836 Torrey, apparently unacquainted with Presl's species, described in his monograph[2] *S. lenticularis* from the "North-west Coast of America, near Observatory Inlet, *Dr. Scouler*," remarking that it is "nearly related to *S. sylvaticus* but differs in its larger spikes, lenticular nut, diandrous flowers, and bifid style ; that species [*S. sylvaticus*] having shorter spikes, a triangular nut, triandrous flowers, and a 3-cleft style." For *S. sylvaticus* he cited three stations : "Canada, *Michaux ;* Hudson's Bay Country, *Dr. Richardson ;* Island of Sitka, Russian America, *Mertens*,"

[1] Presl. Reliq. Haenk. i. 195. [2] Ann. N. Y. Lyc. Nat. Hist. iii. 328.

observing, however, that "I have seen no North American specimens of this plant except those in Michaux's herbarium, which I did not examine with sufficient accuracy for determining whether they are identical with the *S. sylvaticus* of Europe." Thus in view of Torrey's note it seems that there was little left at that time to stand for the Linnean *S. sylvaticus* in America.

In the first edition (1848) of the Manual, Dr. Gray gave no recognition to any American form of this group but the well-marked *S. atrovirens*, Muhl. In the second edition (1856), however, *S. sylvaticus* was clearly described with a 3-cleft style and six bristles, but the range given was "N. New England and northward," and *S. atrovirens* was included under it as a variety. This disposition of the plants was followed until the fifth edition (1867) when *S. atrovirens* was reinstated as a species and the range of *S. sylvaticus* was given as "Base of the White Mountains, New Hampshire (*Oakes*), and northward." In a note Dr. Gray then added that "*S. microcarpus*, Presl., *S. lenticularis*, Torr., apparently a form of *S. sylvaticus* with a 2-cleft style and flat achenium, approaches our northwestern borders." Shortly thereafter, apparently in 1868, finding, as his pencil note indicates, that the Oakes specimen from the "base of the White Mountains" had lenticular achenes and four bristles, Dr. Gray marked upon the sheet "not *Scirpus sylvaticus*, L., but *S. microcarpus*." This seems to have been the first recognition of a plant in the east with these characters, so well known in the northwestern species.

Böckeler, in his monograph, two years later (1870), included *Scirpus sylvaticus* as a North American plant, but of *S. lenticularis*, Torr., he made the variety *digynus* [1] citing no specimens.

In the sixth edition (1889) of Gray's Manual, Böckeler's varietal name was taken up for the northeastern plant which in former editions had passed as true *S. sylvaticus*, *S. microcarpus*, Presl, being cited as a synonym: the name *S. sylvaticus* was at the same time rightly applied to a conspicuous plant which is common from Massachusetts southward, but which for some unaccountable reason seems to have escaped earlier recognition.

Prof. Britton was apparently the first to give *Scirpus sylvaticus* and the common plant of northern New England and Canada, with its 2-cleft style, recognition as a distinct species. In 1892, in his list of the species of *Scirpus*,[2] he considers the northeastern plant identical

[1] Böckeler, Linnaea xxxvi. 727. [2] Trans. N. Y. Acad. Sci. xi. 74.

with the Pacific coast *S. microcarpus*, and in the Illustrated Flora the same name is given it. That the northeastern species, passing as "*S. microcarpus*," is clearly distinct from *S. sylvaticus*, there can be no doubt. The latter is a coarser plant, with conspicuously broader leaves and more ample inflorescence. The spikelets are rarely more than six or eight in a glomerule (generally fewer), and the rays of the umbel are ordinarily much more elongated. It has a uniformly 3-parted style and three stamens and usually six bristles, and the larger achene is darker colored and with a distinct ridge or angle on the back. This plant, the true *S. sylvaticus*, is of decidedly more southern range than the other, barely reaching southern Maine and New Hampshire, and from there extending southward to the Carolinas. In its flowering season, too, as shown by the dates on eighty herbarium labels of the two species, it is about *three weeks later* than the more slender northern plant.

Although the slender northeastern plant agrees with the northwestern and Pacific coast *S. microcarpus* in having 2-cleft styles and four bristles, and whitish barely angled achenes, there is little else to suggest their identity. The true *S. microcarpus* is as coarse a plant as the eastern and European *S. sylvaticus*. Its leaves are broad and its inflorescence ample, with long often flexuous rays. The spikelets are solitary or in glomerules of from 2 to 8. The upper sheaths of the plant in all the specimens examined are green or very slightly reddish tinged, and it is stated by those who know the plant in the field that in fresh plants there is no striking color in the upper sheaths. The more slender eastern plant, on the other hand, is quickly recognized by the deep purplish-red band at the base of each sheath, although this same color is occasionally seen in the otherwise dissimilar *S. sylvaticus*.

The northeastern species, from the apparent constancy of this marking, may be called

S. rubrotinctus. Stem slender or rather stout, 4 to 9 dm. high: leaves smooth, 4 to 13 mm. wide, the upper equalling or slightly exceeding the umbel; the sheaths conspicuously colored with red or purplish brown; involucral leaves mostly 3, the longest sometimes exceeding the umbel: rays of the umbel numerous, the 3 to 5 longest ones 0.5 to 1.5 dm. long, stiff, ascending, subequal, the many shorter ones ascending or spreading; the branchlets and ultimate branchlets of the inflorescence stiff, not flexuous: spikelets 4 to 6 mm. long, ovate-oblong to cylindric, in glomerules of from 3 to many; scales

ovate, blunt, finely suffused with green and black: stamens 2: style 2-cleft: achene obovate, short-beaked, plano-convex on the back, whitish, 1 mm. long: bristles 4 (rarely 5), retrorsely barbed nearly to the base. — *S. sylvaticus*, Gray, Man. ed. 2, 3, 4, 5 as to range, but not description. *S. sylvaticus*, L., var. *digynus*, Wats. & Coult. in Gray, Man. ed. 6, 581, and most American authors, not Böckeler. *S. microcarpus*, Britton, Trans. N. Y. Acad. Sci. xi. 81, for the most part, and Britton & Brown, Ill. Fl. i. 269, mostly, not Presl. — The common representative of the *sylvaticus* group in the northern states and Canada. New Brunswick, Grand Manan, July 30, 1891 (*J. R. Churchill*): Quebec, Gaspé Basin, July 24, 1882 (*John Macoun*, no. 68); Natashquam River, July 14, 1895 (*Sinclair Kennedy*); Roberval, July 27 (over-ripe), 1892 (*G. G. Kennedy*): Ontario, Port Stanley, June 22, 1882 (*John Macoun*): Manitoba, Lake Winnipeg Valley, 1851 (*Bourgeau*): Assiniboia, Swift Current, June 27, 1894 (*John Macoun*, no. 7536): Maine, Foxcroft, July 18, 1895 (*M. L. Fernald*, no. 301); Southport, Aug. 7, 1894 (*M. L. Fernald*), and abundant throughout: New Hampshire, White Mts. (*Oakes*, *Boott*, *Faxon*, et al.), ascending to 1300 m. on Mt. Clinton (*Kennedy & Williams*); Fitzwilliam, June 18, 1894 (*E. F. Williams*): Vermont, Willoughby Lake, July 4, 1854 (*Wm. Boott*); Mt. Mansfield, Aug. 22 (over-ripe), 1880 (*C. G. Pringle*): Massachusetts, Medford, July 7, 1867 (*Wm. Boott*); Milton, June 5, 1890 (*G. G. Kennedy*); Canton, June 4, 1880 (*E. Faxon*); Dedham, June 17, 1891 (*W. P. Rich*): New York, Danube, Herkimer Co., July 15, 1863 (*C. F. Austin*): Michigan, Keeweenaw Co., Aug., 1890 (*O. A. Farwell*, no. 549a): Colorado, 1874 (*W. A. Henry*); Oak Creek, Fremont Co., 1873 (*T. S. Brandegee*): Utah, Wasatch Mts., July, 1869 (*S. Watson*, no. 1215).

S. rubrotinctus, var. **confertus.** Rays of inflorescence short: glomerules compacted into dense clusters 1.5 to 4 cm. in diameter. — Green, Maine, July 10, 1878 (*F. Lamson-Scribner*). A dense-headed extreme parallel with *S. cyperinus*, var. *condensatus*, and *S. atrocinctus*, var. *brachypodus*.

S. sylvaticus, L., var. **Bissellii.** Spikelets linear or linear-oblong, 7 to 10 mm. long, in dense glomerules: sheaths conspicuously reddened below as in *S. rubrotinctus*. — In a swamp at Southington, Connecticut, July 22, 1898, no. 716, July 6, 1899 (*C. H. Bissell*); July 23, 1898 (*Luman Andrews*). An extremely long-spiked form with the sheaths more brightly colored than in the species, suggesting *S. rubrotinctus*: in its 3-cleft style, pale brown definitely angled achene, and other floral characters, clearly an extreme form of *S. sylvaticus*. In its development of long narrow spikes this plant exhibits a tendency which is paralleled in other species of *Scirpus* — as *S. cyperinus*, var. *Andrewsii*, *S. pedicellatus*, var. *pullus*, and *S. atrocinctus*, var. *grandis* described above, and *S. polyphyllus*, var. *macrostachys*, Böckeler (*S. Peckii*, Britton).

Gray Herbarium.